P-K COMPACT®

Water Heater
(Boiler Water)

Operating and Maintenance Instructions

P-K Reference# _____

LOCATION: _____

_____

_____

CONTRACTOR: _____

RATING: _____ GPM _____ °F. to _____ °F.

BOILER WATER IN AT _____ °F. to _____ °F.

SHELL DESIGN PRESSURE _____ P.S.I.G.

TUBE SECTION DESIGN PRESSURE _____ °F.

PATTERSON-KELLEY
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PLEASE READ CAREFULLY BEFORE INSTALLING

General Information

Upon receipt of this shipment, please inspect the unit for any damage. The P-K COMPACT® water heater was thoroughly inspected and tested prior to shipment, and any damage should be reported to the transportation company immediately. Please refer to the P-K Serial Number of the unit when contacting the local P-K Sales Representative.

P-K COMPACT water heaters are completely packaged, ready to connect to services.

A standard packaged unit has the following trim:

- Shell insulated and covered with a reinforced PVC jacket
- Control valve
- Doubled solenoid temperature-limit system
- Circulation pump
- Thermometer
- Relief valve

General Operating Information

The diagrams on Page 4 show the general arrangement of the P-K COMPACT water heater in operation.

The water is rapidly heated as it is directed over the tubes by segmental baffles. Above the baffled bundle, minimum storage volume is provided to give the controls sufficient time to produce the close temperature control.

The circulation pump maintains proper water velocity across the tubes, producing a high rate of heat transfer. Constant circulation produces extremely high performance and close temperature control, while preventing scale formation in all but the harshest hard-water conditions.

The shell section functions primarily as a "minimum storage" to permit the temperature control valve to open or close according to hot water demands without discharging unheated or overheated water.

The Anticipator temperature control is located in the small storage section just above the heat exchanger.

Placement

The heater should be placed with 8" headroom above it to permit removal of the relief valve.

The heater should be secured to the building floor or mounting pad.

Plumbing

Water Connections: Connect properly sized water service lines to the unit without check valves and provide suitable gate valve. The hot water outlet may be run "dead-end"; however, a recirculated hot water line will provide hot water more rapidly to the fixtures.

When two or more heaters are piped in parallel, be sure the cold water inlet and hot water outlets are equally balanced to prevent one heater from carrying the bulk of the load. Reverse return piping is recommended for multiple unit installations

Relief Valve

A properly sized relief valve is installed on the connection provided at the top of the heater. **This valve must be piped to the sewer without decreasing the pipe size or installing any valves. Failure to pipe to a drain could cause a hazardous condition as well as flooding of the equipment room.**

Heater Recirculation

All COMPACT water heaters have a properly sized integral circulator (all bronze). The heater recirculation pump is not intended to function as a building recirculation pump.

Electrical

The circulation pump normally provided has a 115 volt, single phase motor which may be connected to ordinary house wiring. The connecting wires should be 12 gauge and a suitable fuse switch provided as protection from short circuits. The wires should be protected by standard circuits.

Temperature-Limit System

A double solenoid temperature-limit system is furnished as standard to prevent a runaway condition, should

the control valve fail in the open position. The double solenoid system is controlled by a single pole, double-throw thermostat which should be set at least 15 °F above the control point of the temperature control valve sensor. In the event of control sensor failure, the thermostat will activate the three-way solenoid valve, relieving the pressure on the steam valve diaphragm and allow the valve to close.

Pipe Dump Valve to Drain

A 1/2" solenoid dump valve located on top near the hot water outlet will allow any excess hot water in the tank to be dumped into a drain, preventing overheated water from entering the hot water piping of the building. **The dump valve must be piped to a drain. Failure to pipe it to a drain could cause a hazardous condition as well as flooding of the equipment room.**

Operation and Adjustment

1. Turn on water supply to unit.
2. Trip relief valve to expel entrained air.
3. Lubricate pump and read pump installation manual before starting.
4. Turn on circulation pump. (Do not operate pump before water is in unit!)
5. Turn on boiler water.
6. Turn on faucets or other devices.
7. Operate unit at approximately 1/2 rated capacity.
8. Adjust the control valve to obtain desired outlet temperature. This is the setpoint. Please carefully read the manufacturer's instructions for adjusting the control valve. Since the P-K COMPACT is used with many water temperatures, they are not set at the factory.
9. Rerun the unit at one-half low capacity as in Item 7 and recheck the setpoint.

SERVICE TIPS

Failure	Remedy
1. Water temperature too high	Check setting of temperature sensor.
	Check for dirt or foreign material in bleed ports on self-contained steam piloted valves.
	Check for proper spring tension on air-operated valves.
	Check for dirt under seat of valves.
	Check for proper seating of valve.
	Bad sensing element. (See enclosed valve literature.)
2. Erratic temperature control	Check for proper rotation of circulation pump.
	Check for flow of circulator pump, (be sure pump is pumping.)
	Check valves in pipe line must be open.
	Check for proper boiler water flow. Be sure it is not more than heater is designed to operate at.
3. Loss of recovery or poor recovery	Check for proper air pressure on valves. (See valve bulletin.)
	Shut down unit -- and inspect tube bundle for scale or fouling, restricting heat transfer.
	Clean with Dow Chemical Versene 100 or equal.
	Replace tube bundle, using non-asbestos gaskets.
	Check and be sure heater design rating is not being exceeded. (See specifications on front cover of this manual.)

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Removal of Tube Bundle

To remove tube bundle, use the following procedure:

1. Valve off boiler water supply.
2. Valve off cold water supply to heater.
3. Valve off hot water to building.
4. Valve off recirculation line.
5. Turn off all power to heater.
6. Break flange or union on valve and return line.
7. Loosen nuts on top of tube bundle flange. This will permit dropping of tube bundle for inspection without breaking the seal on the boiler water bonnet.
8. To check the tube bundle for leaks, simply remove the bonnet only. Tubesheet is threaded to permit examination of possible ruptured tubes without draining heater.
9. When reassembling heater or replacing tube bundle, use new gaskets supplied by manufacturer.

Recommended Spare Parts

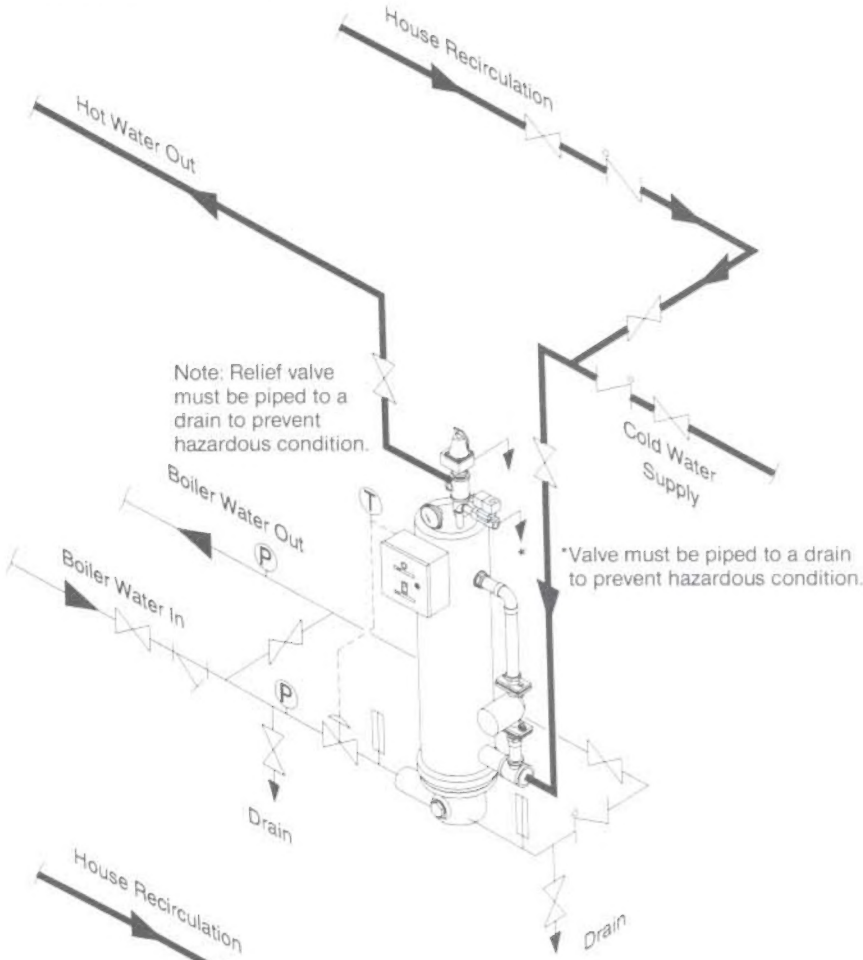
1. Circulator pump -- bearing and seal assembly.
2. Thermometer.
3. Temperature sensor on air-operated valve, use Accritem.
4. Relief valve.
5. Solenoid Thermostat.
6. Solenoid 3-way valve.
7. Replacement tube bundle.
8. Tube bundle gaskets.

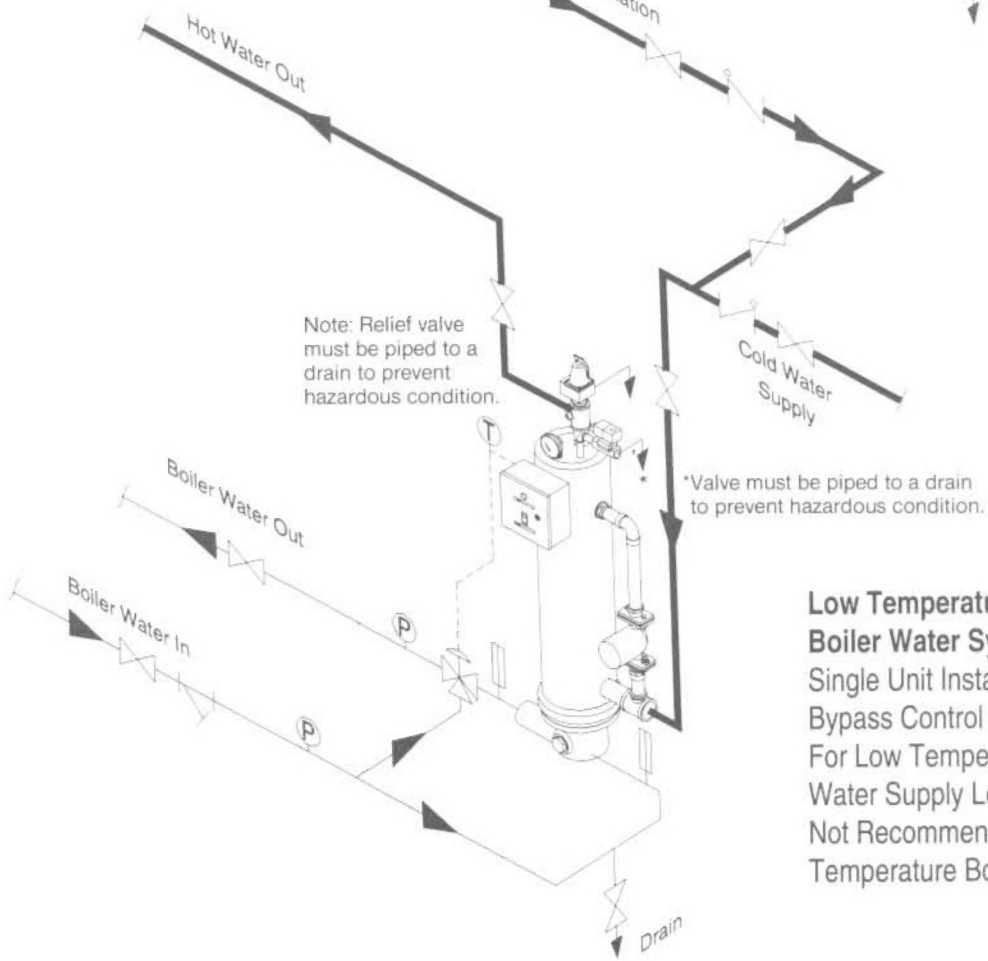
Note: When requesting parts, always mention P-K Serial Number, part name and model and the size of the part needed.

PIPING ARRANGEMENTS

High Temperature Boiler Water System:
Single Unit Installation,
Two-Way Control Valve
For Boiler Water Supply
Temperatures Above 240°F.

	Stop Valve		Strainer
	Check Valve		Relief Valve
	Control Valve		Thermometer
	Orifice Union		Steam Trap
T	Thermal Control Gage		Circulator
P	Pressure Gage		Balancing Cock
	Pipe Union or Flanges		Petcock
C	Compound Pressure Gage		Flow Indicator





Low Temperature Boiler Water System:
Single Unit Installation,
Bypass Control Valve
For Low Temperature Boiler
Water Supply Less Than 240°F.
Not Recommended For High
Temperature Boiler Water.